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applications than upon the logical rigor with which fundamental principles are established. The book of Miller and Lilly seems to be decidedly usable as a class textbook, and is likely to find favor among teachers.

L. M. Hoskins.

Stanford University.

PROBLEMS AND SOLUTIONS.

Edited by B. F. Finkel and R. P. Baker.

[Send all Communications to B. F. FINKEL, Springfield, Mo.]

PROBLEMS FOR SOLUTION.

ALGEBRA.

468. Proposed by H. C. FEEMSTER, York College, Nebraska.

In each of the following series find the nth term and sum:

(a) $2 + 5 + 9 + 15 + 24 + \cdots$
(b) $1 + 6 + 10 + 20 + 35 + \cdots$
(c) $1 + 5 + 15 + 35 + 70 + \cdots$

469. Proposed by T. H. GRONWALL, New York City.

Show that the equation

$$f(x) = 2ax^4 + (1 - b)x^3 + b(1 - b)x - 2ab = 0,$$

where $0 < b < 1$, $a > 0$ and $a^2 > b$ has only one positive root and that this root lies between the roots of $g(x) = x^2 - 2ax + b = 0$.

470. Proposed by ERNEST W. BROWN, Yale University.

There are n numbers each lying between $-\frac{1}{2}$ and $+\frac{1}{2}$, such that any value of each between these limits is equally probable. What is the probability that their sum will lie between $s - \frac{1}{2}$ and $s + \frac{1}{2}$, where s is an integral multiple of $\frac{1}{2}$?

GEOMETRY.

499. Proposed by NATHAN ALTSHILLER, University of Oklahoma.

Find the surfaces all the plane sections of which are circles.

500. Proposed by R. T. McGREGOR, Bangor, California.

$OABC$, $OA'B'C'$ are two straight lines such that AA', BB', CC' are parallel. AB', $A'C$ meet in P; $A'B$ and AC' meet in Q. Show by synthetic projective geometry that PQ is parallel to AA'. Milne's *Projective Geometry,* Chap. I, Ex. 20.

501. Proposed by R. P. BAKER, University of Iowa.

Find the minimum amount of lumber one inch thick required to pack a gross of spheres three inches in diameter in a rectangular box.

502. Proposed by R. P. BAKER, University of Iowa.

A designer of machinery requires a curve having the following properties:

(1) A closed curve touching a given circle at two diametral points and enclosing it.
(2) The sum of the three radii from the center of this circle to the curve which make with each other angles of 120° is constant.